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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,183	05/19/2005	Paraskevas Tsobanakis	CGL01/0122US01	8068
38550	7590	01/10/2008	EXAMINER	
CARGILL, INCORPORATED			BARNHART, LORA ELIZABETH	
LAW/24				
15407 MCGINTY ROAD WEST			ART UNIT	
WAYZATA, MN 55391			PAPER NUMBER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/509,183	Applicant(s) TSOBANAKIS ET AL.	
	Examiner Lora E. Barnhart	Art Unit 1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-49 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                               | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                      | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

### DETAILED ACTION

Claims 1-49 are currently pending.

#### *Election/Restrictions*

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-13, drawn to a method of preparing a  $\beta$ -hydroxycarboxylic acid ester (HCAE) comprising contacting a  $\beta$ -hydroxycarboxylic acid (HCA) with an alcohol and a catalyst under particular conditions.

Group II, claim(s) 14-27, drawn to a first method of preparing an  $\alpha,\beta$ -unsaturated carboxylic acid (UCA) comprising heating an aqueous solution comprising an HCA.

Group III, claim(s) 28-36, drawn to a second method of preparing a UCA comprising vaporizing in the presence of a dehydration catalyst a solution comprising an HCA that has been prepared from fermentation broth comprising said HA.

Group IV, claim(s) 37-42, drawn to a first method for preparing an  $\alpha,\beta$ -unsaturated carboxylic acid ester (UCAE) comprising heating a solution comprising a HCA or HCAE, an alcohol, and a dehydration catalyst.

Group V, claim(s) 43-48, drawn to a method for preparing an alkoxy derivative of a HCA comprising heating in a closed reactor an aqueous solution comprising a HCA, an alcohol, and a basic catalyst.

Group VI, claim(s) 49, drawn to a second method for preparing a UCAE comprising heating a solution comprising a HCA, an alcohol, and a water-immiscible solvent.

The inventions listed as Groups I-VI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: They lack inventive unity because they are drawn to six methods that do not make the same product and do

not require the same steps or starting materials. The methods as claimed do not overlap in scope.

An international or a national stage application containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the following combinations of categories: (1) a product and a process specially adapted for the manufacture of said product; (2) a product and a process of use of said product; (3) a product, a process specially adapted for the manufacture of the said product, and a use of the said product; (4) a process and an apparatus or means specifically designed for carrying out the said process; or (5) a product, a process specially adapted for the manufacture of the said product, and an apparatus or means specifically designed for carrying out the said process. **If multiple products, processes of manufacture or uses are claimed, the first invention of the category first mentioned in the claims of the application and the first recited invention of each of the other categories related thereto will be considered as the main invention in the claims.** See 37 C.F.R. 1.475.

In this case, the claims recite six distinct methods. Groups I and VI start with a HCA and yield an HCAE; Groups II and III start with a HCA and yield a UCA; Group IV starts with a HCA or HCAE and yields a UCAE; and Group V starts with a HCA and yields an alkoxy derivative of said HCA. The methods do not share steps; Groups II and IV-VI require heating, Group III requires vaporizing, and Group I merely requires contacting. Group V requires a closed reactor that is not required by the other methods. The methods are not unified by a common catalyst; Group I requires an esterification catalyst, Group IV requires a dehydration catalyst, and Group V requires a basic catalyst.

All that is shared by the methods as claimed is  $\beta$ -hydroxycarboxylic acids, which were known in the art at the time of the invention. For example, as stipulated by applicant at page 2, lines 14-23, of the as-filed specification, Gokarn et al. (2007, U.S. Patent 7,186,541; reference A) teaches 3-hydroxypropionic acid, a HCA, methods for producing it from fermentation broths, and methods of making various related compounds.

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

HCAs: (a) 3-hydroxypropionic acid, (b) 3-hydroxy-2-methylpropionic acid, (c) 3-hydroxybutanoic acid, (d) 3-hydroxy-2-methylbutanoic acid, (e) 3-hydroxy-2-methylpentanoic acid, (f) 3-hydroxy-3-methylbutanoic acid, (g) 2,3-dimethyl-3-hydroxybutanoic acid, and (h) 3-hydroxy-3-phenylpropionic acid, as in claims 3, 10, 18, 24, 32, 41, and 46; elect ONE if any of Groups I-VI is elected.

Water-immiscible extractants: (i) amides, (j) ethers, (k) ketones, (l) phosphorus esters, (n) phosphine oxides, (o) phosphine sulfides, and (p) alkyl sulfides, as in claim 12; elect ONE if Group I is elected.

Salts: (q) alkali metal salts, (r) alkaline earth metal salts, and (s) ammonium salts, as in claim 15; elect ONE if Group II is elected. Claims 16 and 17 will be examined to the extent they read on this election.

Basic catalysts: (t) alkali metal hydroxides, (u) alkali metal oxides, (v) alkaline earth hydroxides, and (w) alkaline earth oxides, as in claim 44; elect ONE if Group V is elected.

Alkaline earth hydroxides: (x) magnesium hydroxide and (y) calcium hydroxide, as in claim 45; elect ONE if Group V and species (v) are both elected.

Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

The following claim(s) are generic: 1, 2, 5-9, 13, 14, 20-23, 26-31, 35-40, 43, 48, and 49.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: Pursuant to PCT Rule 13.2 and PCT Administrative Instructions, Annex B, Part 1(f)(I)(B)(2), the species are not art-recognized equivalents. When alternatives of chemical compounds are claimed, they shall be regarded as being of a similar nature where all alternatives have a common property or activity, and either a significant structural element is shared by all of the alternatives, or all of the alternatives belong to a recognized class of chemical compounds in the art to which the invention pertains. The words "significant structural element is shared by all of the alternatives" refer to cases where the compounds share a common chemical structure which occupies a large portion of their structures, or in case the compounds have in common only a small portion of their structures, the commonly shared structure constitutes a structurally distinctive portion in view of existing prior art, and the common structure is essential to the common property or activity. The structural element may be a single component or a combination of

individual components linked together. The words "recognized class of chemical compounds" mean that there is an expectation from the knowledge in the art that members of the class will behave in the same way in the context of the claimed invention. In other words, each member could be substituted one for the other, with the expectation that the same intended result would be achieved.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

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remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lora E. Barnhart whose telephone number is 571-272-1928. The examiner can normally be reached on Monday-Thursday, 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lora E Barnhart  
Patent Examiner

